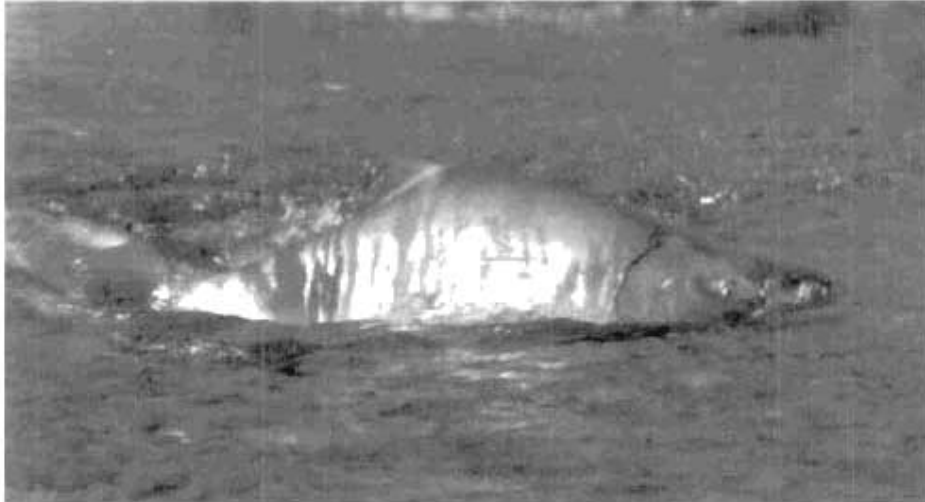


NORTON SOUND AND KOTZEBUE SOUND MANAGEMENT AREA

SALMON CATCH AND ESCAPEMENT REPORT, 1999



By

Tom Kohler

Regional Information Report¹ No. 3A00-21

Alaska Department of Fish and Game
Commercial Fisheries Division, AYK Region
333 Raspberry Road
Anchorage, Alaska 99518-1599

April 2000

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ABSTRACT

The 1999 commercial and subsistence harvest and escapement information for the five species of Pacific salmon *Oncorhynchus* found in the Norton Sound and Port Clarence Management Area and the one species of *Oncorhynchus* found in the Kotzebue Sound Management Area in significant abundance are presented, along with available age, sex, and length information. The 1999 Norton Sound District commercial harvest totaled 23,051 salmon and was composed of 2,508 chinook (*O. tshawytscha*), 7,881 chum (*O. keta*), and 12,662 coho (*O. kisutch*) salmon. The commercial harvest was 68% below the 1994-98 average for chinook salmon, 68% below for chum salmon, and 77% below for coho salmon. There was no reported commercial harvest of pink salmon in 1999. Sockeye salmon are only present in small numbers in this area. Seven counting tower projects and one weir project were operational in Norton Sound in 1999 to provide more complete information on salmon spawning escapements, and those data are reported here. In the Kotzebue District, the commercial harvest totaled 139,120 chum salmon. An incidental catch of 5 chinook salmon and 1,502 Dolly Varden was also reported. Subsistence catches of these species plus whitefish, sheefish, northern pike and burbot also occur in the Kotzebue District. The chum salmon commercial harvest in 1999 was 49% of the 1979-98 average of 281,210 fish.

KEY WORDS: Norton Sound, Kotzebue Sound, harvest, escapement, *Oncorhynchus tshawytscha*, *O. nerku*, *O. keta*, *O. kisutch*, *O. gorbuscha*, age-sex-length composition, fishery synopsis

INTRODUCTION

The Norton Sound, Port Clarence, and Kotzebue Sound commercial salmon management districts include all waters of Alaska from Point Romanof, south of Stebbins, to Point Hope, north of Kotzebue. The Port Clarence District has been closed to commercial salmon fishing since 1966. The Norton Sound District includes all waters of Alaska from Point Romanof to Cape Douglas (Figure 1, 2) and consists of six subdistricts: 1 (Nome), 2 (Golovin), 3 (Moses Point), 4 (Norton Bay), 5 (Shaktoolik), and 6 (Unalakleet). These subdistricts are intended to concentrate commercial harvests on stocks which spawn in the watersheds flowing into the respective subdistricts. The Kotzebue Sound District includes all waters of Alaska from Point Hope to Cape Prince of Wales, but commercial salmon fishing is restricted to Subdistricts 1 and 2, consisting of ocean waters north of the Baldwin Peninsula (Figures 3, 4). Subdistrict 2, Noatak River mouth, normally remains closed unless the chum salmon return is substantially above average.

Five species of Pacific salmon are found in the Norton Sound and Kotzebue Sound areas. In descending order of economic importance in 1999, they are chinook salmon (*O. tshawytscha*), coho salmon (*Oncorhynchus kisutch*), chum salmon (*O. keta*), pink salmon (*O. gorbuscha*), and sockeye salmon (*O. nerka*). In Norton Sound the returns of coho salmon during 1999 were the largest of the five species, followed by, chinook, chum, pink, and sockeye salmon. In the Kotzebue Sound District, chum salmon are the predominant species.

Knowledge of the magnitude, distribution, timing, and age-sex-length composition of both the harvest and escapement by stock is fundamental to managing salmon fisheries and achieving full production. Age, sex, and length composition of samples from selected salmon harvests and escapements in the Norton Sound and Kotzebue Sound areas have been reported since 1962 and are presented in this report for 1999.

Fishery statistics for the Norton Sound and Kotzebue Sound areas are available from several additional sources. Commercial and subsistence harvest and spawning escapement data from 1961 to 1999 are summarized in the Norton Sound - Port Clarence - Kotzebue Sound Annual Management Report (Brennan et al. *In Prep*). In addition, the results from escapement assessment projects are analyzed and reported annually. For the 1999 season these included test fishery projects on the Unalakleet River (Kohler, 2000g) and the Kobuk River (Kohler, 2000h), counting tower projects on the Kwiniuk River (Kohler, 2000a), Niukluk River (Kohler, 2000c), North River (Kohler, 2000d), Eldorado River (Kohler, 2000e) and Snake River (Kohler, 2000f), and a weir on the Nome River (Kohler, 2000b).

Age, sex, and length data for Norton Sound and Kotzebue Sound salmon from 1962 to 1982 are summarized in an unpublished report series entitled ADF&G Arctic-Yukon-Kuskokwim Region Age-Sex-Size Composition of Salmon. Beginning with the 1983 season these data have been published in an annual report (Bigler and Lean 1983, 1986; Hamner 1987, 1989a, 1989b; Buklis 1991a, 1991b; Lingnau 1992, 1994a, 1994b; Blaney and Lingnau 1995; Lingnau 1995, 1996, 1997, 1998; Kohler 2000i).

This report presents catch, escapement and age-sex-length data for the Norton Sound and Kotzebue Sound management areas for 1999.

METHODS

Harvest and Escapement

Commercial catch data presented in this report were compiled from harvest receipts, i.e., *fish tickets*, which document each sale by a licensed fisherman. These data were summarized by microcomputer in the Nome and Kotzebue offices during the fishing season.

Funds were dedicated beginning in 1994 to conduct in-depth subsistence harvest surveys for most villages in the Kotzebue, Port Clarence the Norton Sound Districts. These surveys were continued in 1999. Villages surveyed in the Norton Sound and Port Clarence Areas were Brevig Mission, Elim, Golovin, Koyuk, Shaktoolik, St. Michael, Stebbins, Teller, Unalakleet, and White Mountain. In the Kotzebue Area, the villages of Ambler, Kiana, Kobuk, Noatak, Noorvik and Shungnak were surveyed. In Kotzebue, postcards to be filled out and returned were sent to households to assess harvests of salmon. A subsistence permit is required to subsistence fish in the Nome Subdistrict, and catch limits are set by permit for each river and species. During community surveys the members of each household were asked how many salmon were caught for subsistence use. It was assumed that fishermen could accurately recall their harvests, which may have occurred over a period of several months.

The Division of Subsistence has conducted other in-depth subsistence harvest interviews in the region. These studies include the city of Kotzebue in 1986 (Georgette and Loon 1993), the village of Unalakleet in 1989-90 (Magdanz and Seitz 1993), Elim in 1992 and 1993 (Jim Magdanz, ADF&G, Nome, personal communication), the Nome Subdistrict in 1975-1991 (Magdanz 1992), and Brevig Mission, Golovin and Shishmaref in 1989 (Conger and Magdanz 1990).

Aerial surveys historically have been the primary method for monitoring salmon escapements to the Norton Sound and Kotzebue Sound drainages although a number of escapement projects are now operating in Norton Sound. Aerial surveys do not provide a total estimate of salmon spawning abundance. Aerial survey escapement counts are, at best, an index of relative abundance for the surveyed streams. To compare aerial surveys across years, surveys are attempted in approximately the same time frame each year for the same index areas. Weather conditions, pilots and surveyors are also variables in aerial survey counts. Comparing commercial catch statistics to previous years may provide an index of run strength and timing. Test fishing provides an index of escapement and species composition for turbid or large drainages that are difficult to monitor visually, but does not provide an estimate of total abundance. Test fishery catch and catch per unit effort (CPUE) statistics are used as an index of relative abundance. A test fishing project on the Unalakleet River in the Unalakleet Subdistrict was used to index escapement into that drainage. In the Kotzebue Sound area a test fishing project was conducted on the Kobuk River near the village of Kiana to index salmon escapements into the Kobuk River system. Due to a lack of technical resources, the

sonar escapement project on the Noatak River did not operate in 1999. Test drift net fishing on the Noatak River was conducted to collect age, sex, and length information. Counting towers and weirs provide a better estimate of escapement. The following projects conducted during the 1999 season provided data on salmon escapement abundance and timing in Norton Sound: Nome River weir and Snake and Eldorado River towers in Subdistrict 1, Niukluk River tower in Subdistrict 2, Kwiniuk River tower in Subdistrict 3, and North River tower in Subdistrict 6 (Appendix B).

Age, Sex, and Length Data Collection

Age was determined from scales removed from the left side of the fish in an area above the lateral line crossed by a diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin. Scales were mounted on gum cards and impressions made in cellulose acetate. Ages were reported in European notation (the first digit refers to the freshwater age and does not include the year spent in the gravel; the second digit refers to the ocean age). Sex was determined by examining external characteristics, such as: snout, vent, body symmetry, extruded eggs, ovipositor or milt of live fish. The sex of dead fish was determined by examining the gonads, if necessary. Fish length to the nearest millimeter was measured from mid-eye to fork-of-tail. In some cases sex and length data but no ageable scales were obtained from fish, and in other cases ageable scales were collected without corresponding sex or length data. Therefore, numbers of fish in a length-by-age summary table may differ from numbers of fish in a sex-by-age summary table for a given fishery or escapement sample.

Sample Size

Minimum sample size goals were established for temporal strata based upon simultaneous interval estimation of age class composition. Two methods of determining sample size goals, based on different methods of constructing simultaneous confidence intervals, have been employed. For most purposes, sample size goals were developed using the method of Thompson (1987). Sample size goals were established such that 95% simultaneous confidence intervals would be of width 0.2. This objective is satisfied with a sample size of 128 scales per strata, although the goal was increased to account for the expected number of unreadable scales in any particular instance. In the Kotzebue commercial fishery, where age composition is an important index of run strength, a sample size goal was developed using more stringent standards based on the method of Bromaghin (1993). The ages of chum salmon were categorized into three age classes; age 4, age 5, and age 3 or age 6. The sample size goal was chosen such that the width of 95% simultaneous confidence intervals (Goodman 1965) would not exceed 0.15. A sample of 249 fish per stratum satisfied this objective. The sample size goal was increased to 280 fish per stratum to account for the expected number of unreadable scales.

RESULTS

Commercial fishery samples were collected from chinook, chum and coho salmon in Norton Sound Subdistrict 6. Sufficient commercial fishery samples were collected to estimate age and sex composition of the harvest for chum salmon in the Kotzebue District. Chinook, chum, and coho salmon were sampled from the Unalakleet River set gillnet test fishing catch. Because of the selectivity of the 5-7/8 in (149 mm) stretched-mesh gillnets used on the test net project, the samples are not an unbiased estimate of spawning escapement age, sex, and size composition. Chum salmon escapement samples were collected from projects on the Niukluk and Kwiniuk Rivers using beach seines. In the Kotzebue District, chum salmon from drift test fishing catches were sampled on both the Kobuk and Noatak Rivers. Comparisons of age, sex, and size composition between samples in this report are non-statistical comparisons. Temporal distribution of some samples may be of concern. Some sample sizes are marginally adequate and may not have been collected proportionally to the catch or abundance.

Norton Sound

Commercial and Subsistence Harvest

The 1999 Norton Sound commercial harvest totaled 23,051 salmon and was composed of 12,662 coho, 7,881 chum, and 2,508 chinook salmon (Table 1). Subdistrict 6 accounted for 78% of the total commercial salmon harvest (in numbers of fish) in 1999, followed by Subdistrict 5 (22%).

Chinook salmon accounted for 52% of the total fishery value followed by coho salmon (40%) and chum salmon (8%). Only one buyer purchased fish during the 1999 season. Salmon were delivered to Unalakleet via tender and aircraft for processing. The salmon were headed and gutted, then shipped air freight to markets. A few fishermen sold their catch locally and to wholesale distributors, as permitted under catcher/seller regulations. The average price paid was \$0.82 per pound for chinook, \$0.35/lb for coho, and \$0.11/lb for chum salmon. The total ex-vessel value of the raw fish was \$76,860, 83% below the previous 5 year (1994-1998) average.

Although many of the residents of Norton Sound are dependent to some extent on the fish and game resources of the area, subsistence salmon catches generally were not monitored from 1983 through 1993, except in the Nome Subdistrict. Prior to 1983 the Department conducted annual household surveys in many of the villages. For the last 5 years in which these surveys were conducted, 1978-1982, the average annual subsistence harvest in the Norton Sound area was 73,000 salmon for all species combined. Because not all households were contacted, this should be considered a minimum estimate. In the Nome Subdistrict (Figure 2), subsistence permits require that fishermen document their harvest by species. There were 153 subsistence permits issued in 1999. A total of 118 permits were returned. The reported permit harvest of 1,353 salmon was composed of 39 chinook, 265 sockeye, 266 coho, 698 chum, and 85 pink salmon (Table 2). Funds have been dedicated to conduct comprehensive subsistence surveys in Norton Sound and Kotzebue Sound from since 1994. The villages surveyed in 1999 are listed in the methods section.

Results of the survey for 1999 indicate an estimated 67,313 salmon were harvested for subsistence purposes in Norton Sound and Port Clarence (Table 3). This estimate includes the permit fishery in Northern Norton Sound. The largest contribution to the harvest was chum salmon, followed by pink, coho, chinook, and sockeye salmon. The largest quantity of salmon was taken by the village of Unalakleet (25,127). Port Clarence villages harvested an estimated 6,234 salmon. Sockeye salmon were the most abundant followed by chum, coho, pink, and chinook salmon. An estimated 97,006 salmon were harvested for subsistence purposes in Kotzebue Sound, the vast majority being chum salmon (Table 13).

Escapement Abundance

Aerial survey escapement information is only an indication of run strength. Because of the many factors under which aerial surveys are conducted, this methodology of enumerating salmon does not provide estimates of total escapement abundance. Aerial survey escapement results from Norton Sound for 1999 are found in Table 4. Overall the chinook salmon escapements were about one half to one third of average levels throughout Norton Sound. Chum salmon escapements were well below average throughout most of Norton Sound. In the Nome Subdistrict the chum salmon escapement was estimated to be one quarter to one half the escapement goal. Poor survey conditions in other areas of Norton Sound precluded chum salmon surveys. Coho salmon escapements were well below average in the Northern subdistricts while Eastern Norton Sound escapements were near average.

There have been several new cooperative escapement projects implemented in recent years. These projects are listed under METHODS, *Harvests and Escapements* and the counts for 1999 are presented in Appendix B. The only project with an escapement goal is the Kwiniuk River tower. That biological escapement goal is 15,600-31,200 for chum salmon only, as it is the species with the longest historical escapement information. The Kwiniuk River had tower counts of 8,763 chum salmon 608 pink salmon, and 115 chinook salmon. The Nome River weir enumerated 2,033 pink salmon, 1,048 chum salmon, 417 coho salmon, 3 chinook salmon, and 236 Dolly Varden. Counts past the Niukluk River tower were 35,240 chum salmon, 20,355 pink salmon, 4,260 coho salmon, 40 chinook salmon, and 3,170 Dolly Varden. Snake River tower counts were 484 chum salmon, 116 pink salmon, 90 coho salmon and 20 chinook salmon. The Eldorado River tower project counted 4,218 chum salmon, 977 pink salmon, 28 chinook salmon and 510 coho salmon. The North River tower, a tributary of the Unalakleet River, counted 48,993 pink salmon, 5,600 chum salmon, 2,263 chinook salmon and 4,792 coho salmon. Projects were not funded to enumerate entire runs of some salmon species, therefore some species counts should be considered conservative estimates.

Age, Sex, and Length Composition

There was no chinook salmon commercial harvest sample collected in Subdistrict 5 during 1999. The chinook salmon commercial harvest sample in Subdistrict 6 was composed of 3% age-1.2, 9% age-1.3, 81% age-1.4, 1% age-2.3, 2% age-2.4, and 4% age-1.5 fish. The sample was 43% male and 57% female (Table 5). A sample of 51 chinook salmon from the Unalakleet River test fishery was 12% age-1.2, 14% age-1.3, 71% age-1.4, 2% age-2.3, and 2% age-1.5, with 51% of the total being male (Table 6). Mean lengths by age group from these samples ranged from 564 mm for age-1.2 males from the Subdistrict 6 commercial catch to 920 mm for age-1.5 males from the Subdistrict 6 commercial catch.

The Subdistrict 6 chum salmon sample age composition was mostly age 0.3 (64%), followed by age 0.4 (34%). Females accounted for 48% of the sample (Table 7). A sample of 339 chum salmon from the Unalakleet River test fishery was 58% age-0.3, 40% age-0.4, and 1% age-0.5. The sex composition consisted of 28% males and 72% females (Table 8). The combined escapement sample from the Kwiniuk River above and below the tower was 47% age 0.3 and 52% age 0.4 (Table 9). The Niukluk River escapement sample was 67% age-0.3, followed by 31% age-0.4. Males comprised 47% of the Niukluk River sample and 51% in the Kwiniuk River sample. Mean lengths by age group for all samples collected ranged from 520 mm for age-0.2 females from the Kwiniuk River escapement to 632 mm for age-0.5 males from the Unalakleet River test fishing sample.

Age-2.1 dominated in the subdistrict 6 coho commercial catch, accounting for 92%, with 66% being males (Table 10). There were 186 coho salmon sampled from the Unalakleet River test fishery with 94% age-2.1 (Table 11). Males made up 57% of the sample. Mean lengths by age group for all samples collected ranged from 563 mm for age-3.1 males in the Unalakleet River test fishing sample to 603mm for age-3.1 females in the subdistrict 6 catch sample.

Kotzebue Sound

Commercial Harvest

The commercial harvest in the Kotzebue District during 1999 consisted of 138,605 chum salmon, 5 chinook salmon and 1,502 Dolly Varden (Table 12). The commercial chum harvest was below the projected harvest of 150,000-250,000 salmon due to poor market conditions and the buyer's limited capacity. It was also well below the 20-year (1979-1998) average of 217,807. Only 60 permits were fished this year making it the second lowest participation level since 1967. The low fishing effort was attributed to low prices. It is thought that fishermen found employment that provided a higher and more consistent income.

The buyer purchased a total of 1,108,898 pounds of chum salmon (average weight 8.0 pounds) at \$0.16 per pound, 80 pounds of chinook salmon (average weight 16.0 pounds) at an average price of \$1.00 per pound, and 11,352 pounds of Dolly Varden (average weight 7.6 pounds) at an average price of \$0.20 per pound. The buyer used an average weight of 8.0 pounds for chum

salmon. This was done to reduce labor costs that would cut into the already marginal profits as allowed by Alaska Statute 16.10.270 (a). The total ex-vessel value was \$179,781 to Kotzebue area fishermen with an average of \$2,996 for each participating permit holder. The lone buyer packed the fish in ice and flew them in the round to Anchorage or Bethel for processing.

Limited commercial harvest of miscellaneous finfish has been allowed since statehood, normally under the auspices of a permit, which delineates harvest levels, open areas, legal gear, etc. There was no reported commercial harvest of whitefish, pike, or burbot during the 1999 commercial season. Sheefish are caught and sold primarily between mid-November and late March. Although some permit holders annually renew their permits, only one registered with the Kotzebue Fish and Game Office. Sales did occur during the 1999 season but no fish tickets were turned in to the Department and the extent of the harvest and its value is unknown.

Sikusuilag Springs Hatchery

The total predicted return of hatchery chum salmon was 18,000. No commercial sampling for adipose clipped chum salmon was conducted in 1999 and high turbid water made observation of returns to the hatchery site impractical. No conclusions can be made of the hatchery contribution to the 1999 commercial catch or escapement.

Subsistence Harvest

Preliminary results from the Division of Subsistence survey indicate an estimated subsistence harvest of 97,006 salmon in the Kotzebue Sound area in 1999, with 98% of the harvest being chum salmon (Table 13). Smaller quantities of the other four species of salmon were reportedly harvested. The city of Kotzebue had the largest estimated harvest of 77,265 salmon, with the village of Ambler taking the smallest quantity (690 salmon). The subsistence harvest of sheefish from the Kobuk River villages was 8,257. The village of Noorvik reported a harvest of 4,034 sheefish followed by Shungnak with 2,293. There was an estimated subsistence harvest of 56,326 whitefish from area villages.

Escapement Abundance

Surveys in the Kotzebue District revealed that the aerial survey goal was met in all index areas (Table 14). It should be noted that the Noatak River was only surveyed once under poor conditions and prior to the peak spawning period. It is believed that the aerial survey goal was met or exceeded in all of the historically surveyed index areas.

Age, Sex, and Length Composition

Age groups 0.3 and 0.4 typically dominate the commercial chum salmon catch, with smaller percentages of age-0.2 and age-0.5 fish. The chum salmon commercial harvest for the season was composed of an estimated 0.9% age 0.2, 87.5% age 0.3, 10.6% age 0.4, 0.9% age 0.5, and 0.2% age 0.6. Mean lengths from the commercial catch ranged from 636 mm for age-0.6 males to 579 mm for age-0.2 females (Table 15). Sufficient samples were collected to stratify the season by fishing period (Appendix C).

Age composition from the Noatak and Kobuk River chum salmon drift gillnet test fishing samples were rather disparate, with age 0.3 at 70% and 92%, and age 0.4 at 22% and 6%, for these two locations respectively. Both samples had smaller numbers of age-0.2, age-0.5 and age-0.6 fish. Forty percent of the samples from the Kobuk River were female, whereas 47% of the samples from the Noatak River test fishery were female. Mean lengths from the drift test fish samples ranged from 631 mm for age-0.4 females from the Noatak River sample to 573 mm for age-0.2 males from the Kobuk River sample (Table 16). Sufficient test fishing catch samples from the Kobuk River were collected to stratify the season into four periods (Appendix C).

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Table 1. Norton Sound commercial salmon effort, catch and weight (pounds) by subdistrict, 1999.

Subdistrict	Number of Fishermen	Chinook		Sockeye		Coho		Pink		Chum		Total	
		No. Fish	Weight	No. Fish	Weight	No. Fish	Weight	No. Fish	Weight	No. Fish	Weight	No. Fish	Weight
1													
2													
3													
4													
5	15	581	12,395			2,398	16,683			2,181	16,904	5,160	45,982
6	45	1,927	36,026			10,264	71,354			5,700	40,752	17,891	148,132
Total	82	2,508	48,421			12,662	88,037			7,881	57,656	23,051	194,114

Table 2. Subsistence permit harvests of salmon in Norton Sound and Port Clarence, 1999.

Location	Permits Issued ^a	Permits Returned ^a	Permits Fished	Chinook	Sockeye	Coho	Pink	Chum	Total Salmon
Marine Waters	54	47	12	10	63	8	4	235	320
Nome River	12	9	4	0	8	46	2	7	63
Snake River	4	3	2	0	0	12	11	8	31
Eldorado River	11	11	5	0	12	69	11	32	124
Flambeau River	7	4	3	0	2	0	5	32	39
Bonanza River	12	11	3	1	0	9	20	18	48
Safety Sound	1	1	1	0	0	7	0	0	7
Solomon River	1	1	1	0	0	10	5	5	20
Penny River	0	0	0	0	0	0	0	0	0
Niukluk River	9	6	4	0	0	85	27	270	382
Sinuk River	3	1	0	0	0	0	0	0	0
Kuzitrin River	2	2	2	0	0	0	0	0	0
Pilgrim River	33	20	11	28	180	20	0	91	319
Unknown River	4	2	0	0	0	0	0	0	0
Total^b	153	118	48	39	265	266	85	698	1,353

^a Permits issued by the Alaska Department of Fish and Game, Division of Commercial Fisheries in Nome.

^b Preliminary information.

Table 3. Estimates of subsistence harvests of salmon in the Norton Sound and Port Clarence Area, 1999.

Village	Chinook	Chum	Pink	Sockeye	Coho	Total Salmon
Nome	11	337	58	85	161	652
Golovin	56	1,692	172	48	784	2,752
White Mountain	4	1,964	298	-	450	2,716
Elim	424	744	1,564	13	975	3,720
Koyuk	327	4,153	1,943	-	167	6,590
Shaktoolik	818	467	5,092	183	1,556	8,116
Unalakleet	2,691	3,692	10,067	537	8,140	25,127
Stebbins	760	3,312	459	200	1,312	6,043
St. Michael	1,053	3,036	365	111	798	5,363
Brevig Mission	38	748	666	919	774	3,145
Teller	52	1,188	120	1,473	256	3,089
Total	6,234	21,333	20,804	3,569	15,373	67,313

Table 4. Salmon survey counts of Norton Sound streams and associated chum salmon escapement goals, 1999.

Stream Name	Chinook	Coho	Sockeye	Pink	Chum	Chum Goal
Salmon L.			31,720			
Grand Central R.			1,780			
Pilgrim R.	11	754	308		487	
Glacial L.			425			
Sinuk R.		217	550	180	1,697	3,600-7,200
Cripple R.		101		275	200	
Penny R.		105		10	40,015	
Snake R.		260		200	400	800-1,600
Nome R.		620		345	375	1,600-3,200
Flambeau R.					55	Combined w/Flambeau
Eldorado R.	8	71		123,950	3,000	5,200-10,400
Bonanza R.				245	361	1,000-1,900
Solomon R.		62		90	51	300-550
Fish R.		821		20	50	Combined w/Niukluk
Boston Cr.		319				Combined w/Niukluk
Niukluk R.		619			640	23,200-46,400
Ophir Cr.		61				
Kwiniuk R.	115 ^a	223		608 ^a	8,763 ^a	15,600-31,200 ^b
Tubutulik R.						13,600-27,200
Inglutalik R.						
Ungalik R.		703		4,100	2,260	
Shaktoolik R.		710		820	1,640	
Unalakeet R.	3	78				Combined w/Unalakleet
Old Woman R.		37			5	2,400-4,800
North River	18	533		3,790	1,480	

Note: A multitude of factors affect escapement survey counts. The escapement survey counts here are instantaneous counts which do not represent total escapement. Chum goals pertain to aerial surveys in all cases except for Kwiniuk River which has a counting tower goal. Refer to text for an evaluation of the return.

a Preliminary expanded tower counts.

b Chum goal for tower count.

Table 5 Norton Sound Subdistrict 6 chinook salmon commercial catch sample age and sex composition, and mean length, 1999.

		Brood Year and (Age Group)						Total
		1995 (1.2)	1994 (1.3)	1993 (1.4)	1993 (2.3)	1992 (1.5)	1992 (2.4)	
Sampling Dates:		7/3 - 7/6						
Sample Size:		139						
Female	Percent of Sample		0.7%	53.2%		2.9%		56.8%
	Number in Sample		1	74		4		79
	Mean length (mm) ^a		875	872		918		
Male	Percent of Sample	2.9%	8.6%	28.1%	0.7%	0.7%	2.2%	43.2%
	Number in Sample	4	12	39	1	1	3	60
	Mean length (mm) ^a	564	626	815	710	920	900	
Totals	Percent of Sample	2.9%	9.4%	81.3%	0.7%	3.6%	2.2%	100%
	Number in Sample	4	13	113	1	5	3	139

^a Length was from mid-eye to fork of tail.

Table 6. Unalakleet River chinook salmon test fishing sample age and sex composition and mean length, 1999.

		<u>Brood Year and (Age Group)</u>					Total
		1995 (1.2)	1994 (1.3)	1993 (1.4)	1993 (2.3)	1992 (1.5)	
Sampling Dates:		7/1 - 7/21					
Sample Size:		51					
Female	Percent of Sample		2.0%	47.1%			49.0%
	Number in Sample		1	24			25
	Mean length (mm) *		870	855			
Male	Percent of Sample	11.8%	11.8%	23.5%	2.0%	2.0%	51.0%
	Number in Sample	6	6	12	1	1	26
	Mean length (mm) *	579	576	768	700	900	
Totals	Percent of Sample	11.8%	13.7%	70.6%	2.0%	2.0%	100.0%
	Number in Sample	6	7	36	1	1	51

* Length was from mid-eye to fork of tail.

Table 7. Norton Sound Subdistrict 6 chum salmon commercial catch sample age and sex composition, and mean length, 1999

		<u>Brood Year and (Age Group)</u>				Total
		1996 (0.2)	1995 (0.3)	1994 (0.4)	1993 (0.5)	
Sampling Dates	7/9 - 7/16					
Sample Size	288					
Male	Percent of Sample	0.7%	22.6%	14.2%	0.3%	52.2%
	Number in Sample	2	65	41	1	109
	Mean length (mm) ^a	598	591	611	550	
Female	Percent of Sample	0.3%	41.3%	19.8%	0.7%	47.8%
	Number in Sample	1	119	57	2	179
	Mean length (mm) ^a	580	574	581	583	
Totals	Percent of Sample	1.0%	63.9%	34.0%	1.0%	100.0%
	Number in Sample	3	184	98	3	288

^a Length was from mid-eye to fork of tail

Table 8. Unalakleet River chum salmon test fishing catch sample age and sex composition, and mean length, 1999.

		<u>Brood Year and (Age Group)</u>			Total
		1995 (0.3)	1994 (0.4)	1993 (0.5)	
Sampling Dates: 6/27 - 8/23					
Sample Size: 339					
Male	Percent of Sample	38.6%	25.1%	0.9%	27.9%
	Number in Sample	131	85	3	219
	Mean length (mm) ^a	605	630	632	
Female	Percent of Sample	19.8%	15.3%	0.3%	72.1%
	Number in Sample	67	52	1	120
	Mean length (mm) ^a	584	601	625	
Totals	Percent of Sample	58.4%	40.4%	1.2%	100.0%
	Number in Sample	198	137	4	339

^a Length was from mid-eye to fork of tail.

Table 9. Norton Sound District chum salmon escapement sample age and sex composition, and mean length, 1999.

		Brood Year and (Age Group)				
		1996	1995	1994	1993	
		(0.2)	(0.3)	(0.4)	(0.5)	Total
Kwiniuk River						
Sampling Dates:		7/1-7/23				
Sample Size:		247				
Male	Percent of Sample	0.4	23.1	27.5	0.4	51.4
	Number	1	57	68	1	127
	Mean length (mm) ^a	575	586	610	600	
Female	Percent of Sample	0.0	23.9	24.3	0.4	48.6
	Number in Escapem	0	59	60	1	120
	Mean length (mm) ^a		542	558	625	
Total	Percent of Sample	0.4	47.0	51.8	0.8	100.0
	Number	1	116	128	2	247
Niukluk River						
Sampling Dates:		07/19-08/29				
Sample Size:		350				
Male	Percent of Sample	0.6	31.4	15.4	0.0	47.4
	Number	2	110	54	0	166
	Mean length (mm) ^a	573	601	611		
Female	Percent of Sample	0.6	36.0	16.0	0.0	52.6
	Number	2	126	56	0	184
	Mean length (mm) ^a	580	559	584	0	
Total	Percent of Sample	1.2	67.4	31.4	0.0	100.0
	Number	4	236	110	0	350

^a Length was from mid-eye to fork of tail.

Table 10. Norton Sound Subdistrict 6 coho salmon commercial catch sample age and sex composition, and mean length, 1999.

		Brood Year and (Age Group)		Total
		1995 (2.1)	1994 (3.1)	
Sampling Dates: 07/30-09/02				
Sample Size: 103				
Male	Percent of Sample	61.1	4.9	66.0
	Number	63	5	68
	Mean length (mm) ^a	585	575	
Female	Percent of Sample	31.1	2.9	34.0
	Number	32	3	35
	Mean length (mm) ^a	585	603	
Total	Percent of Sample	92.2	7.8	100.0
	Number	95	8	103

^a Length was from mid-eye to fork of tail.

Table 11. Unalakleet River coho salmon test fishing catch sample age and sex composition, and mean length, 1999.

		Brood Year and (Age Group)		
		1995 (2.1)	1994 (3.1)	Total
Sampling Dates: 08/03, 08/10, 08/17				
Sample Size: 185				
Male	Percent of Sample	54.8	2.1	56.9
	Number	102	4	106
	Mean length (mm) ^a	571	563	
Female	Percent of Sample	39.3	3.8	43.1
	Number	73	7	80
	Mean length (mm) ^a	587	575	
Total	Percent of Sample	94.1	5.9	100.0
	Number	175	11	186

^a Length was from mid-eye to fork of tail.

Table 12. Kotzebue District commercial catch, weight, and average weight of chum salmon, chinook salmon, and Dolly Varden by period, 1999.

Period	Date	Hours Fished	Number of Fishermen	Catch Rate ^b (chum)	Chum			Chinook			Dolly Varden		
					Number	Pounds	Avg. Wt. ^c	Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.
1	12-Jul-99	12	0	0.0	0	0	0.0	0	0	0.0	0	0	0.0
2	13-Jul-99	12	1	21.0	252	2,016	8.0	0	0	0.0	0	0	0.0
3	15-Jul-99	12	4	12.7	611	4,888	8.0	0	0	0.0	0	0	0.0
4	16-Jul-99	12	3	11.0	395	3,160	8.0	0	0	0.0	0	0	0.0
5	19-Jul-99	12	2	7.9	189	1,512	8.0	0	0	0.0	0	0	0.0
6	20-Jul-99	12	3	10.6	383	3,064	8.0	0	0	0.0	0	0	0.0
7	7/22/1999 ^a	5	2	25.8	258	2,064	8.0	0	0	0.0	0	0	0.0
8	7/23/1999 ^a	5	1	1.8	9	72	8.0	0	0	0.0	0	0	0.0
9	7/24/1999 ^a	1	0.67	120.9	81	648	8.0	0	0	0.0	0	0	0.0
10	7/26/1999 ^a	1	0.67	249.3	187	1,396	8.0	0	0	0.0	0	0	0.0
11	28-Jul-99	12	20	55.8	13,398	107,184	8.0	1	7	7.0	1	6	6.0
12	29-Jul-99	12	15	20.3	3,659	29,272	8.0	0	0	0.0	2	18	9.0
13	30-Jul-99	12	23	29.0	7,999	63,992	8.0	0	0	0.0	2	16	8.0
14	2-Aug-99	12	28	45.5	15,303	122,424	8.0	1	22	0.0	8	55	6.9
15	4-Aug-99	12	27	31.5	10,202	81,616	8.0	0	0	0.0	1	10	10.0
16	6-Aug-99	12	36	33.8	14,589	116,762	8.0	1	10	10.0	6	73	9.1
17	9-Aug-99	12	33	44.1	17,483	139,864	8.0	0	0	0.0	22	167	7.6
18	11-Aug-99	12	34	25.0	10,210	81,680	8.0	0	0	0.0	2	15	7.5
19	12-Aug-99	12	25	27.8	8,346	66,768	8.0	1	41	41.0	8	63	7.9
20	13-Aug-99	12	20	30.3	7,271	58,168	8.0	0	0	0.0	2	14	7.0
21	16-Aug-99	12	23	32.0	8,836	70,688	8.0	0	0	0.0	11	90	8.2
22	17-Aug-99	12	28	21.7	7,287	58,296	8.0	0	0	0.0	13	95	7.3
23	18-Aug-99	12	23	19.8	4,356	34,848	8.0	0	0	0.0	9	86	9.6
24	19-Aug-99	12	5	16.6	997	7,976	8.0	0	0	0.0	5	26	5.6
25	20-Aug-99	12	14	5.2	871	6,968	8.0	0	0	0.0	8	62	7.8
26	23-Aug-99	12	15	11.7	2,104	16,840	8.0	0	0	0.0	106	830	7.8
27	24-Aug-99	12	11	10.4	1,369	10,952	8.0	0	0	0.0	105	741	7.1
28	25-Aug-99	12	12	5.0	722	5,776	8.0	0	0	0.0	239	1,675	7.0
29	26-Aug-99	12	9	5.5	594	4,752	8.0	1	7	7.0	401	3,071	7.7
30	27-Aug-99	12	10	9.8	1,179	9,432	8.0	0	0	0.0	549	4,239	7.7
Totals		324	60		139,120	1,113,018	8.0	5	80	16.0	1,502	11,352	7.6

^a Test fish catches not sold

^b The catch rate is the number of chum salmon per fisherman per hour

^c Chum salmon were not weighed and assumed to be 8 lbs.

Table 13. Estimates of subsistence harvests of salmon, sheefish and whitefish in the Kotzebue Sound Area, 1999.

Village	Chinook	Chum	Pink	Sockeye	Coho	Total Salmon	Sheefish ^a	Whitefish
Kotzebue ^a		64,768	817	478	1,202	67,265	^b	^b
Noorvik	4	17,843	8			17,855	4,034	30,809
Kiana	5	3,788	7		33	3,833	657	5,464
Ambler		590			100	690	559	8,170
Shungnak		3,868				3,868	2,293	9,637
Kobuk		1,869				1,869	614	871
Noatak		1,616	10			1,626	100	1,375
Total	9	94,342	842	478	1,335	97,006	8,257	56,326

^a Preliminary data

^b Not surveyed for this species.

Table 14. Kotzebue District chum salmon aerial survey escapement indices and current goals for primary index streams, 1962-1999. (Indices listed in this table are the peak survey observed for each tributary during the given year) *

Year	Noatak River (64,000-128,000)	El River (Combined with Noatak)	Squirrel River (7,200-14,400)	Salmon River (3,200-6,400)	Tutuksuk River (1,200-2,400)	Upper Kobuk Mainstem (8,000-16,000)
1962	168,000	9,080	5,384	12,936	10,841	9,224
1963	1,970 ^b	35 ^b	2,200	1,535	670	4,535
1964	89,798		6,009	9,353	2,685	7,985
1965	6,152 ^b		7,230	1,500 ^b		2,750
1966	101,640	120	1,350	3,957	1,383	1,474
1967	29,120 ^b		3,332	2,116	169	2,495
1968	39,394	5,502	6,746	3,367	823	2,370
1969	33,945	68	6,714	2,561	159	7,500 ^a
1970	138,145		4,418	3,000 ^b	2,000 ^b	13,908
1971	41,058		6,628	5,453	1,384	17,202
1972	64,315 ^b	3,286 ^b	32,126	2,073 ^b		18,155
1973	32,144		12,345	6,891		2,470 ^a
1974	129,640	22,249	32,523	29,190	8,312	28,120
1975	96,509	1,302	32,258	9,721	1,344 ^b	10,702
1976	44,574	1,205	7,229	1,161	758	2,522 ^a
1977	11,221 ^b	742 ^b	1,964 ^b			
1978	37,817	5,525	1,863	814 ^b	366 ^a	1,981 ^a
1979	15,721 ^b	1,794 ^b	1,500 ^b	674 ^b	382 ^b	2,008
1980	164,474	10,277	13,563	8,456	1,165	11,472
1981	116,352		9,854	4,709	1,114	8,648
1982	20,682 ^b	189 ^b	7,690	1,821 ^c	1,322	14,674
1983	79,773	3,044	5,115	1,677	2,637	33,746
1984	67,873	5,027	5,473	1,471	1,132	10,621
1985	45,525 ^b	855 ^b	6,160	2,884	5,089	6,278
1986	37,227 ^b	4,308 ^b	4,982	1,971	4,257	6,015
1987	5,515 ^b	2,780 ^b	2,708 ^c	3,333	206	8,210
1988	45,930 ^b	8,639 ^a	4,848 ^b	6,208	3,122	11,895 ^a
1989						
1990	23,345 ^b	3,000	6,500	6,335	2,275	15,355
1991	82,750	2,940	4,606	5,845	744	24,525
1992	34,335 ^b	701 ^b	2,765	1,345	1,162	11,803
1993	25,415 ^b	4,795	4,463	13,880	1,196	12,158
1994						
1995	159,260	7,860	10,605	13,988	3,901	35,725
1996	306,900	30,040	21,795	21,740	6,200	74,770
1997	^a	^a	4,778 ^a	1,161 ^b	164 ^b	8,513 ^b
1998	3,121 ^a	^a	^a	^a	^a	816 ^b
1999	59,225 ^b	24,860	13,513	28,220 ^b	2,906 ^b	25,360

* Typically, three aerial surveys are attempted yearly at different intervals for each tributary to assess escapements prior to the peak, at the peak, and after the peak of the run. Indices listed in this table are the largest survey observed for each tributary during the given year.

^a Poor survey conditions or incomplete, early or late survey.

^b Survey by foot or boat.

^c Unacceptable conditions.

Table 15. Kotzebue District chum salmon commercial catch age and sex composition, and mean length, 1999.

		Brood Year and (Age Group)					Total
		1996 (0.2)	1995 (0.3)	1994 (0.4)	1993 (0.5)	1992 (0.6)	
Sampling Dates:	7/10-8/30						
Sample Size:	3,320						
Male	Percent of Sample	0.5	44.9	5.4	0.5	0.1	51.3
	Number in Catch	687	62,439	7,496	660	111	71,393
	Mean length (mm) ^a	583	609	636	626	636	
Female	Percent of Sample	0.4	42.6	5.2	0.4	0.1	48.7
	Number in Catch	502	59,310	7,213	534	168	67,727
	Mean length (mm) ^a	579	600	614	627	621	
Total	Percent of Sample	0.9	87.5	10.6	0.9	0.2	100.0
	Number in Catch	1,189	121,749	14,709	1,194	279	139,120

^a Length was from mid-eye to fork of tail.

Table 16. Kobuk and Noatak River chum salmon drift test fishing catch sample age and sex composition, and mean length, 1999.

		Brood Year and (Age Group)					
		1996 (0.2)	1995 (0.3)	1994 (0.4)	1993 (0.5)	1992 (0.6)	Total
Kobuk River ^a							
Sampling Dates:		7/17-8/13					
Sample size:		913					
Male	Percent of Sample	0.4	54.5	3.4	1.2	0.1	59.6
	Number	4	498	31	11	1	545
	Mean length (mm) ^b	573	608	607	609	590	
Female	Percent of Sample	0.0	37.5	2.5	0.2	0.1	40.3
	Number	0	342	23	2	1	368
	Mean length (mm) ^b		592	607	623	616	
Total	Percent of Sample	0.4	92.0	5.9	1.4	0.2	100.0
	Number	4	840	54	13	2	913
Noatak River ^a							
Sampling Dates:		7/27-8/29					
Sample size:		140					
Male	Percent of Sample	0.7	40.0	10.7	0.7	0.7	52.8
	Number	1	56	15	1	1	74
	Mean length (mm) ^b	627	613	625	628	623	
Female	Percent of Sample	0.0	40.7	6.4	0.0	0.0	47.1
	Number	0	57	9	0	0	66
	Mean length (mm) ^b		608	631		608	
Total	Percent of Sample	5.6	70.1	21.5	2.5	0.4	100.0
	Number	16	199	61	7	1	140

^a Fish sampled from 6 inch mesh size drift gillnet.

^b Length was from mid-eye to fork of tail.

Figure 1. Norton Sound commercial salmon fishing districts and subdistricts.

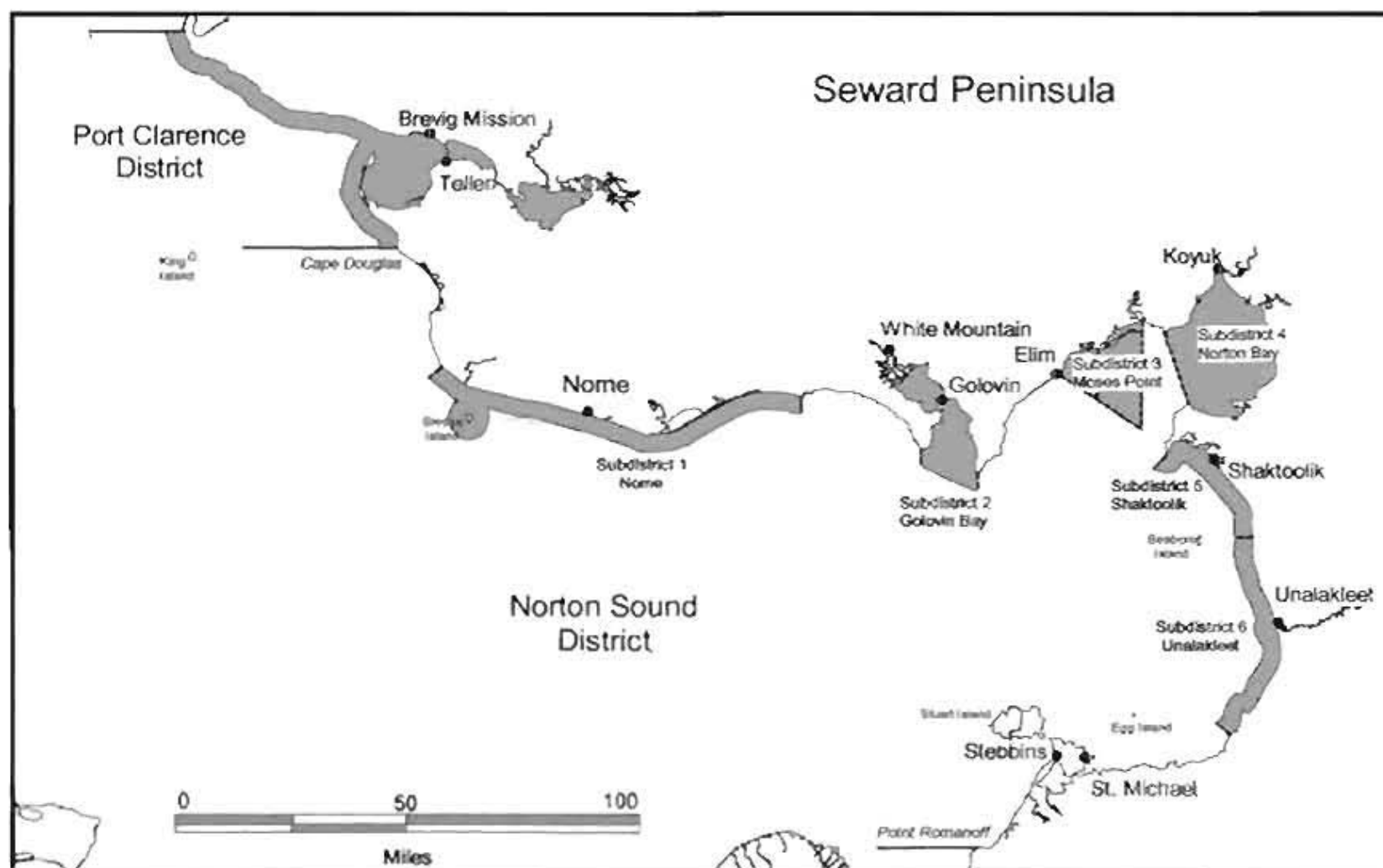
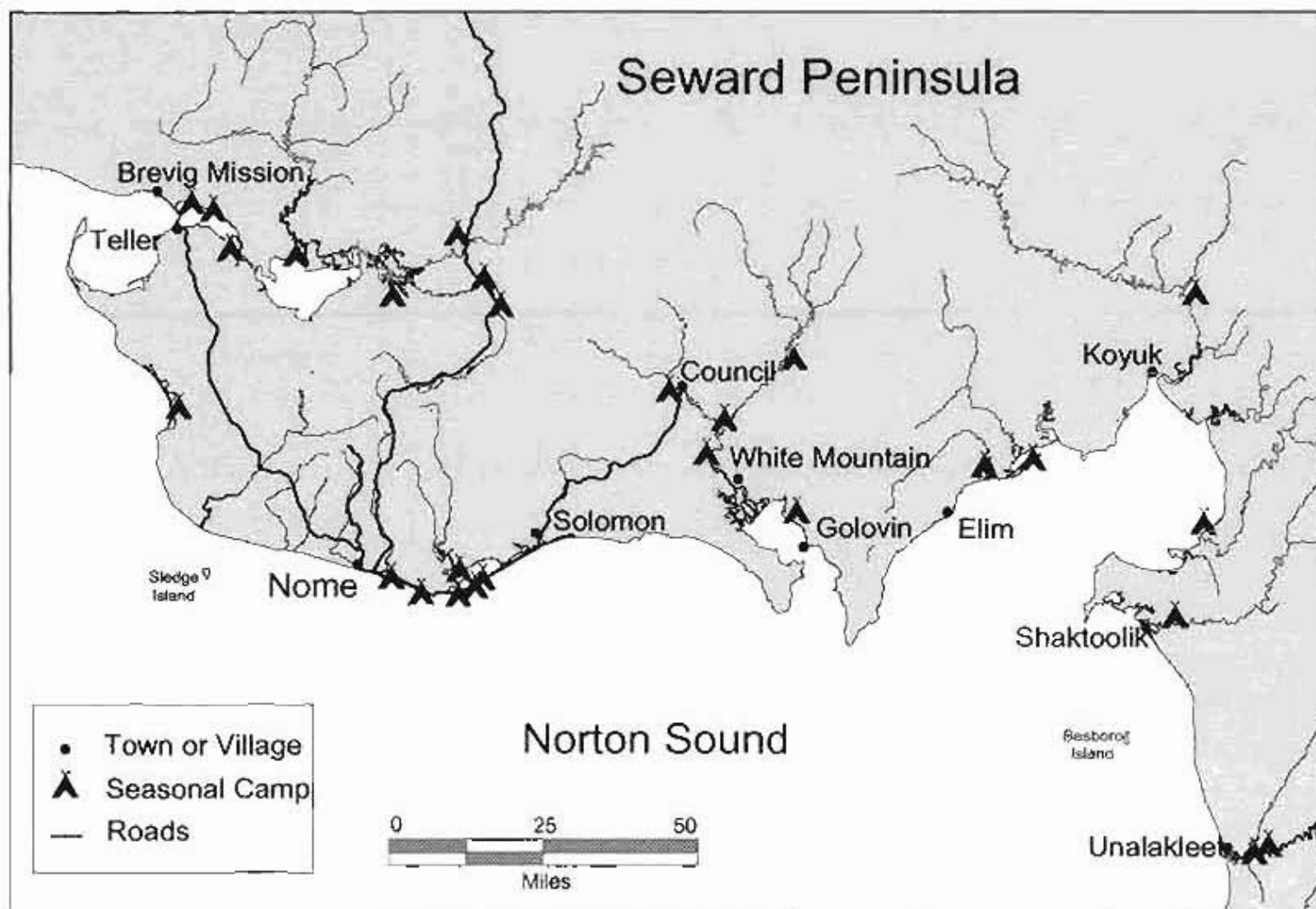


Figure 2. Northern Norton Sound subsistence salmon fishing sites.



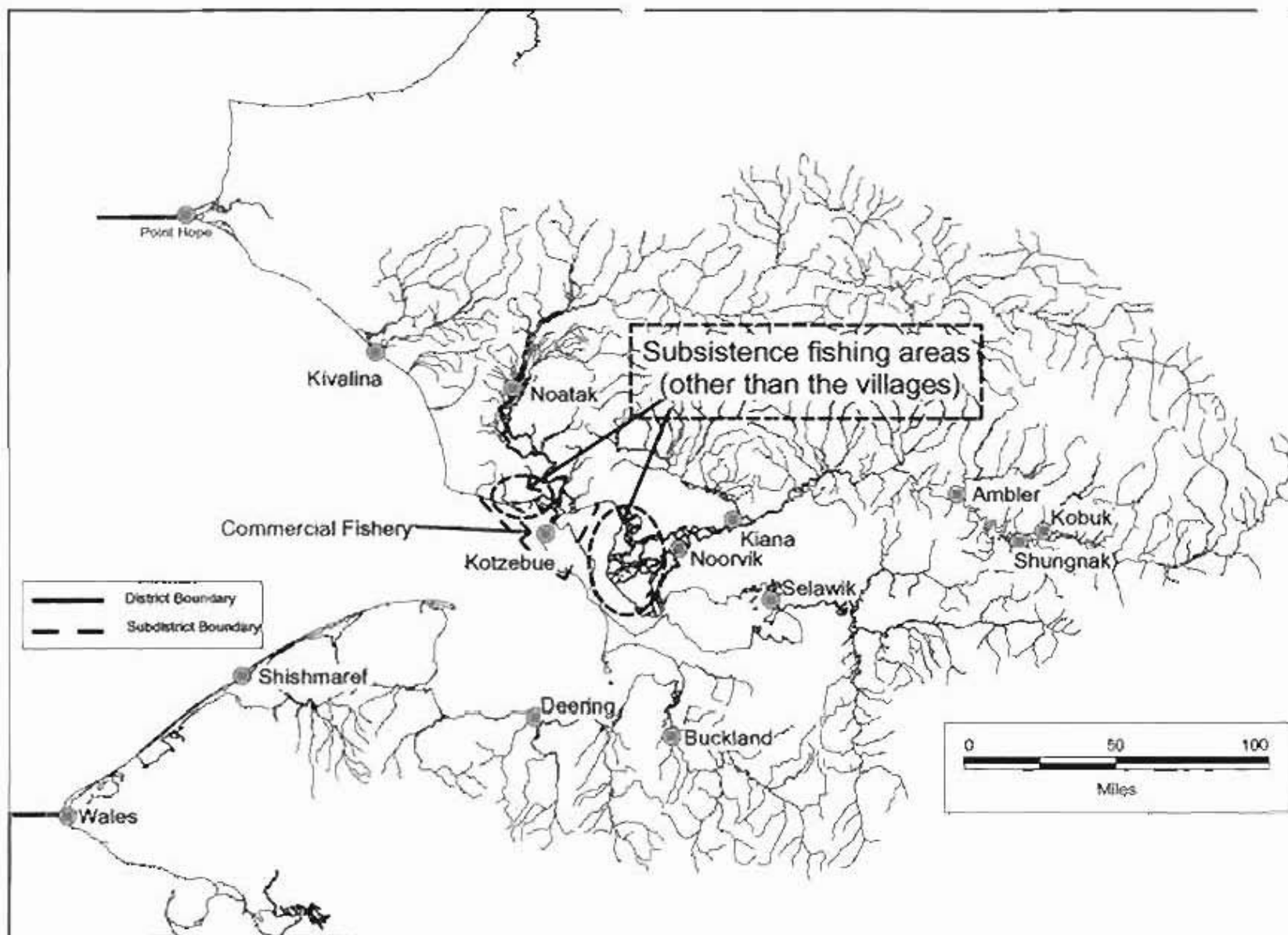
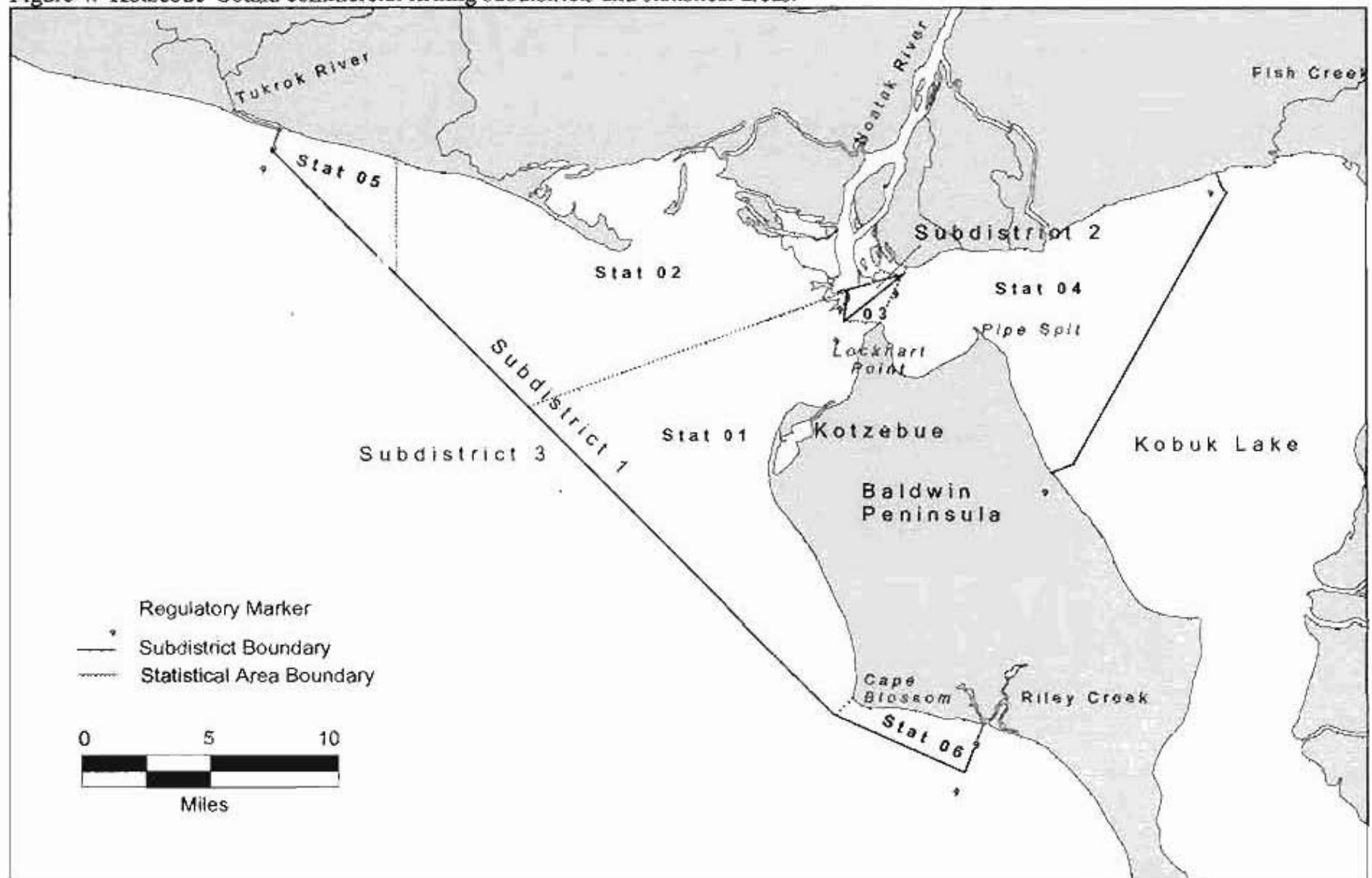


Figure 3. Kotzebue Sound commercial fishing district, villages, and subsistence fishing areas.

Figure 4. Kotzebue Sound commercial fishing subdistricts and statistical areas.



Appendix A.1 Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 1999.

Period Catch and Catch Per Unit Effort												Cumulative Catch and Catch Per Unit Effort							
Period	Hrs. Fished	Date	# FM	Kings	King CPUE	Chum	Chum CPUE	Pinks	Pink CPUE	Coho	Coho CPUE	Kings	King CPUE	Chum	Chum CPUE	Pinks	Pink CPUE	Coho	Coho CPUE
1	24	7/2-7/3	5	70	0.58	24	0.20					70	0.58	24	0.20				
2	24	7/5-7/6	11	128	0.48	41	0.16					198	0.52	65	0.17				
3	24	7/8-7/9	11	265	1.00	353	1.34					463	0.71	418	0.65				
4	24	7/12-7/13	8	94	0.49	58	0.30					557	0.66	476	0.57				
5	24	7/15-7/16	6	24	0.17	1,187	8.24					581	0.59	1,663	1.69				
6	24	7/29-7/30	0									581		1,663	1.69				
7	24	8/2-8/3	9			150	0.69			219	1.01	581		1,813	1.51			219	1.01
8	24	8/5-8/6	8			111	0.58			568	2.96	581		1,924	1.38			787	1.93
9	24	8/9-8/10	8			158	0.82			341	1.78	581		2,082	1.31			1,128	1.88
10	24	8/12-8/13	8			9	0.05			146	0.76	581		2,091	1.18			1,274	1.61
11	24	8/16-8/17	11			49	0.19			660	2.50	581		2,140	1.05			1,934	1.83
12	24	8/19-8/20	5			29	0.24			177	1.48	581		2,169	1.00			2,111	1.80
13	24	8/26-8/27	7			7	0.04			168	1.00	581		2,176	0.93			2,279	1.70
14	24	8/30-8/31	3			3	0.04			75	1.04	581		2,179	0.91			2,354	1.66
15	48	9/2-9/4	2			2	0.02			44	0.46	581		2,181	0.87			2,398	1.59

Total hours fished = 384

Total number of permits fished = 15

Appendix Table A.2 Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 1998.

Period	Hrs Fished	Date	# FM	Kings	Period Catch and Catch Per Unit Effort						Coho CPUE	Cumulative Catch and Catch Per Unit Effort							Coho CPUE
					King CPUE	Chum	Chum CPUE	Pinks	Pink CPUE	Coho		Kings	King CPUE	Chum	Chum CPUE	Pinks	Pink CPUE	Coho	
1	24	7/2-7/3	38	1,039	1.14	766	0.86					1,039	1.14	766	0.86				0
2	24	7/5-7/6	16	235	0.61	579	1.51					1,274	0.98	1,365	1.05				0
3	24	7/8-7/9	26	523	0.84	1,109	1.78					1,797	0.94	2,474	1.29				0
4	24	7/12-7/13	20	80	0.17	767	1.58					1,877	0.78	3,231	1.35				0
5	24	7/15-7/16	12	42	0.15	1,300	4.51					1,919	0.71	4,531	1.69				0
6	24	7/29-7/30	2	0	0.00	61	1.27			12	0.25	1,919	0.70	4,592	1.68			12	0.25
7	24	8/2-8/3	14	0	0.00	236	0.70			281	0.84	1,919	0.62	4,828	1.57			293	0.76
8	24	8/5-8/6	12	3	0.01	122	0.42			633	2.20	1,922	0.57	4,960	1.47			926	1.38
9	24	8/9-8/10	18	1	0.00	214	0.50			1,303	3.02	1,923	0.82	5,164	1.36			2,229	2.02
10	24	8/12-8/13	14	0	0.00	59	0.18			910	2.71	1,923	0.72	5,223	1.27			3,139	2.18
11	24	8/16-8/17	21	0	0.00	154	0.31			2,397	4.76	1,923	0.60	5,377	1.16			5,536	2.65
12	24	8/19-8/20	19	2	0.00	92	0.20			846	1.86	1,925	0.53	5,469	1.07			6,382	2.66
13	24	8/26-8/27	15	1	0.00	124	0.34			1,319	3.66	1,926	0.48	5,593	1.03			7,701	2.79
14	24	8/30-8/31	15	1	0.00	31	0.09			372	1.03	1,927	0.44	5,624	0.97			8,073	2.99
15	48	9/2-9/4	16			76	0.10			2,191	2.85	1,927	0.38	5,700	0.87			10,264	2.64

Total hours fished = 384

Total number of permits fished = 45

Appendix Table B.1. Expanded daily and cumulative migration of all salmon species past the Kwiniuk River counting tower, Norton Sound, 1999.

Date	Daily chum salmon	Cumulative chum salmon	Daily pink salmon	Cumulative pink salmon	Daily king salmon	Cumulative king salmon
25-Jun	0	0	0	0	0	0
26-Jun	0	0	0	0	0	0
27-Jun	8	8	0	0	0	0
28-Jun	4	12	0	0	0	0
29-Jun	0	12	0	0	0	0
30-Jun	14	26	0	0	0	0
1-Jul	2	28	0	0	0	0
2-Jul	70	98	0	0	0	0
3-Jul	30	128	0	0	0	0
4-Jul	349	477	0	0	0	0
5-Jul	451	928	0	0	0	0
6-Jul	552	1,480	0	0	0	0
7-Jul	179	1,659	0	0	0	0
8-Jul	128	1,787	0	0	0	0
9-Jul	506	2,293	0	0	0	0
10-Jul	1,686	3,978	24	24	2	2
11-Jul	1,208	5,186	12	36	16	18
12-Jul	725	5,911	12	48	10	28
13-Jul	242	6,153	12	60	4	32
14-Jul	297	6,450	102	162	36	68
15-Jul	253	6,703	18	180	0	68
16-Jul	129	6,833	0	180	-4	64
17-Jul	243	7,076	25	205	10	74
18-Jul	203	7,278	30	236	0	74
19-Jul	317	7,595	37	273	8	82
20-Jul	432	8,027	44	317	16	98
21-Jul	59	8,086	12	328	3	101
22-Jul	50	8,136	2	331	2	102
23-Jul	44	8,181	14	344	0	102
24-Jul	33	8,214	14	359	0	102
25-Jul	328	8,541	113	472	6	108
26-Jul	153	8,694	62	534	3	111
27-Jul	-22	8,672	12	546	0	111
28-Jul	90	8,763	62	608	4	115

Appendix Table B.2. Daily passage of all salmonid species at the Nome River weir, Norton Sound, 1999.

	Daily chum salmon	Cumulative chum salmon	Daily pink salmon	Cumulative pink salmon	Daily king salmon	Cumulative king salmon	Daily coho salmon	Cumulative coho salmon	Daily Dolly Varden ^a	Cumulative Dolly Varden	Other
2-Jul	0	0	0	0	0	0	0	0	0	0	
3-Jul	0	0	0	0	0	0	0	0	0	0	
4-Jul	0	0	0	0	0	0	0	0	3	3	
5-Jul	1	1	0	0	0	0	0	0	10	13	
6-Jul	0	1	0	0	0	0	0	0	3	16	
7-Jul	0	1	0	0	0	0	0	0	0	16	
8-Jul	0	1	0	0	0	0	0	0	0	16	
9-Jul	18	19	0	0	0	0	0	0	0	16	
10-Jul	25	44	1	1	0	0	0	0	15	31	
11-Jul	8	52	0	1	1	1	0	0	0	31	
12-Jul	7	59	0	1	0	1	0	0	0	31	
13-Jul	5	64	0	1	0	1	0	0	0	31	
14-Jul	11	75	0	1	0	1	0	0	0	31	
15-Jul	49	124	18	19	0	1	0	0	0	31	
16-Jul	17	141	3	22	0	1	0	0	0	31	
17-Jul	2	143	4	26	0	1	0	0	0	31	
18-Jul	98	241	11	37	0	1	0	0	0	31	
19-Jul	13	254	0	37	0	1	0	0	0	31	
20-Jul	32	286	0	37	0	1	0	0	0	31	
21-Jul	101	387	10	47	0	1	0	0	6	37	
22-Jul	1	388	0	47	0	1	0	0	0	37	
23-Jul	12	400	7	54	0	1	0	0	0	37	
24-Jul	0	400	0	54	0	1	0	0	0	37	
25-Jul	0	400	0	54	0	1	0	0	0	37	
26-Jul	1	401	1	55	0	1	0	0	0	37	
27-Jul	34	435	37	92	0	1	0	0	0	37	
28-Jul	7	442	10	102	0	1	0	0	2	39	
29-Jul	42	484	20	122	0	1	0	0	0	39	
30-Jul	29	513	74	196	0	1	1	1	10	49	
31-Jul	65	578	50	246	0	1	0	1	8	57	
1-Aug	5	583	24	270	0	1	0	1	0	57	
2-Aug	15	598	115	385	0	1	1	2	4	61	4 sockeye
3-Aug	55	653	135	520	0	1	0	2	0	61	
4-Aug	28	681	176	696	0	1	6	8	3	64	1 sockeye
5-Aug	16	697	60	756	0	1	4	12	0	64	
6-Aug	59	756	135	891	0	1	0	12	21	85	
7-Aug	127	883	172	1,063	0	1	5	17	0	85	
8-Aug	41	924	164	1,227	1	2	4	21	14	99	
9-Aug	14	938	27	1,254	0	2	0	21	0	99	
10-Aug	19	957	53	1,307	0	2	8	29	0	99	
11-Aug	12	969	53	1,360	0	2	4	33	2	101	1 sockeye
12-Aug	7	976	40	1,400	0	2	1	34	0	101	
13-Aug	2	978	7	1,407	0	2	5	39	2	103	
14-Aug	1	979	4	1,411	0	2	0	39	0	103	
15-Aug	7	986	85	1,496	0	2	7	46	5	108	
16-Aug	5	991	16	1,512	1	3	6	52	0	108	
17-Aug	6	997	34	1,546	0	3	6	58	23	131	
18-Aug	9	1,006	45	1,591	0	3	17	75	0	131	
19-Aug	9	1,015	151	1,742	0	3	175	250	9	140	
20-Aug	2	1,017	10	1,752	0	3	9	259	0	140	
21-Aug	11	1,028	115	1,867	0	3	34	293	22	162	
22-Aug	11	1,039	71	1,938	0	3	38	331	43	205	
23-Aug	1	1,040	41	1,979	0	3	21	352	0	205	
24-Aug	3	1,043	29	2,008	0	3	7	359	8	213	
25-Aug	5	1,048	25	2,033	0	3	58	417	23	236	

^a Dolly Varden were reportedly counted only on approximately half of the days of operation.

Appendix Table B.3 Expanded daily and cumulative migration of all salmonid species past the Niukluk River counting tower, Norton Sound, 1999

Date	Daily chum salmon	Cumulative chum salmon	Daily pink salmon	Cumulative pink salmon	Daily king salmon	Cumulative king salmon	Daily coho salmon	Cumulative coho salmon	Daily Dolly Varden	Cumulative Dolly Varden
4-Jul	4	4	0	0	0	0	0	0	55	55
5-Jul	4	9	2	2	0	0	0	0	94	149
6-Jul	-2	7	0	2	0	0	0	0	69	217
7-Jul	-4	2	16	18	0	0	0	0	41	259
8-Jul	24	26	16	34	0	0	0	0	22	281
9-Jul	430	456	40	74	0	0	0	0	40	320
10-Jul	836	1,292	64	138	0	0	0	0	58	378
11-Jul	1,824	3,116	56	194	6	6	0	0	138	516
12-Jul	1,677	4,793	80	274	10	16	0	0	62	578
13-Jul	468	5,261	50	324	0	16	0	0	26	604
14-Jul	1,020	6,281	46	370	6	22	0	0	34	638
15-Jul	372	6,653	14	384	-2	20	0	0	12	650
16-Jul	598	7,251	20	404	-1	19	0	0	16	666
17-Jul	824	8,076	26	430	0	19	0	0	19	685
18-Jul	2,197	10,273	14	444	0	19	0	0	14	699
19-Jul	1,166	11,439	22	466	0	19	0	0	12	711
20-Jul	1,103	12,542	60	526	0	19	0	0	7	718
21-Jul	645	13,187	184	710	-1	18	0	0	12	730
22-Jul	1,031	14,217	205	915	0	18	0	0	26	757
23-Jul	1,031	15,248	205	1,121	0	18	0	0	42	799
24-Jul	1,692	16,940	372	1,493	0	18	0	0	81	880
25-Jul	1,853	18,793	323	1,815	8	26	0	0	50	930
26-Jul	1,269	20,062	282	2,097	2	28	0	0	23	954
27-Jul	995	21,057	750	2,848	6	34	0	0	66	1,019
28-Jul	1,456	22,513	1,028	3,875	2	36	2	2	73	1,092
29-Jul	1,110	23,623	1,058	4,933	0	36	0	2	54	1,146
30-Jul	1,061	24,684	1,021	5,955	1	87	4	6	58	1,204
31-Jul	1,061	25,745	1,021	6,976	1	38	4	10	58	1,262
1-Aug	1,061	26,806	1,021	7,998	1	39	4	14	58	1,320
2-Aug	1,338	28,144	1,086	9,083	1	40	5	19	47	1,367
3-Aug	1,437	29,582	958	10,041	0	40	7	26	49	1,418
4-Aug	952	30,534	1,218	11,259	0	40	5	31	44	1,460
5-Aug	454	30,988	1,008	12,267	0	40	24	55	44	1,504
6-Aug	537	31,524	939	13,207	0	40	23	78	55	1,559
7-Aug	619	32,143	871	14,078	0	40	22	99	66	1,625
8-Aug	466	32,609	731	14,809	0	40	2	102	53	1,678
9-Aug	416	33,025	472	15,281	0	40	13	115	37	1,715
10-Aug	291	33,316	658	15,939	0	40	20	135	22	1,737
11-Aug	125	33,442	491	16,430	0	40	31	166	10	1,747
12-Aug	234	33,676	318	16,748	0	40	62	228	18	1,765
13-Aug	220	33,896	381	17,129	0	40	61	289	13	1,778
14-Aug	207	34,103	443	17,572	0	40	60	348	8	1,786
15-Aug	190	34,293	325	17,898	0	40	78	426	26	1,812
16-Aug	212	34,505	590	18,488	0	40	118	544	22	1,834
17-Aug	88	34,593	361	18,849	0	40	115	659	22	1,856
18-Aug	163	34,756	549	19,399	0	40	136	794	14	1,870
19-Aug	104	34,860	282	19,681	0	40	191	985	15	1,885
20-Aug	82	34,941	217	19,898	0	40	184	1,170	15	1,900
21-Aug	54	34,995	116	20,014	0	40	165	1,335	11	1,910
22-Aug	49	35,044	62	20,076	0	40	185	1,520	155	2,066
23-Aug	24	35,069	53	20,129	0	40	194	1,714	79	2,145
24-Aug	55	35,124	44	20,173	0	40	163	1,877	63	2,208
25-Aug	24	35,148	9	20,182	0	40	224	2,101	19	2,227
26-Aug	-10	35,138	9	20,190	0	40	93	2,194	229	2,456
27-Aug	15	35,153	10	20,201	0	40	99	2,293	128	2,584
28-Aug	41	35,194	12	20,212	0	40	106	2,399	27	2,611
29-Aug	22	35,217	29	20,242	0	40	151	2,551	68	2,680
30-Aug	0	35,217	9	20,251	0	40	138	2,689	46	2,728
31-Aug	2	35,219	29	20,280	0	40	179	2,867	19	2,745
1-Sep	4	35,223	3	20,283	0	40	231	3,098	44	2,789
2-Sep	0	35,223	6	20,289	0	40	425	3,523	60	2,849
3-Sep	-1	35,222	1	20,290	0	40	278	3,801	38	2,887
4-Sep	-2	35,220	-3	20,287	0	40	131	3,932	16	2,903
5-Sep	4	35,224	24	20,311	0	40	131	4,063	38	2,941
6-Sep	0	35,224	16	20,325	0	40	36	4,099	25	2,966
7-Sep	8	35,232	26	20,352	0	40	99	4,199	150	3,116
8-Sep	8	35,240	3	20,355	0	40	61	4,260	55	3,170

Appendix Table B-4. Expanded daily and cumulative salmon migration past the Snake River counting tower, Norton Sound, 1999.

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily King	Cumulative King	Daily Coho	Cumulative Coho
2-Jul	0	0	0	0	0	0	0	0
3-Jul	0	0	0	0	0	0	0	0
4-Jul	0	0	0	0	0	0	0	0
5-Jul	0	0	0	0	0	0	0	0
6-Jul	0	0	0	0	0	0	0	0
7-Jul	0	0	0	0	0	0	0	0
8-Jul	0	0	0	0	0	0	0	0
9-Jul	0	0	0	0	0	0	0	0
10-Jul	0	0	0	0	0	0	0	0
11-Jul	0	0	0	0	0	0	0	0
12-Jul	-6	-6	0	0	0	0	0	0
13-Jul	-6	-12	0	0	0	0	0	0
14-Jul	-6	-18	0	0	0	0	0	0
15-Jul	-12	-30	0	0	0	0	0	0
16-Jul	-6	-36	0	0	0	0	0	0
17-Jul	-6	-42	0	0	0	0	0	0
18-Jul	0	-42	0	0	0	0	0	0
19-Jul	31	-11	0	0	0	0	0	0
20-Jul	-11	-22	0	0	0	0	0	0
21-Jul	3	-19	0	0	0	0	0	0
22-Jul	-22	-41	0	0	0	0	0	0
23-Jul	-11	-52	0	0	0	0	0	0
24-Jul	13	-39	0	0	0	0	0	0
25-Jul	39	0	0	0	0	0	8	8
26-Jul	25	25	0	0	0	0	0	8
27-Jul	37	62	0	0	0	0	0	8
28-Jul	106	168	0	0	0	0	0	8
29-Jul	54	222	2	2	0	0	0	8
30-Jul	54	276	2	4	0	0	0	8
31-Jul	54	330	2	6	0	0	0	8
1-Aug	54	384	2	8	0	0	0	8
2-Aug	3	387	4	12	0	0	0	8
3-Aug	0	387	0	12	0	0	0	8
4-Aug	0	387	30	42	0	0	0	8
5-Aug	4	391	-4	38	0	0	0	8
6-Aug	-4	387	12	50	0	0	0	8
7-Aug	22	409	23	73	0	0	0	8
8-Aug	22	431	23	96	0	0	0	8
9-Aug	48	479	49	145	0	0	0	8
10-Aug	6	485	-16	129	10	10	46	54
11-Aug	3	488	52	181	0	10	36	90
12-Aug	1	489	4	185	6	16	0	90
13-Aug	3	492	-18	167	10	26	0	90
14-Aug	-8	484	-51	116	-6	20	0	90

Appendix Table B.5. Expanded daily and cumulative migration of all salmon species past the Eldorado River counting tower, Norton Sound, 1999.

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily King	Cumulative King	Daily Coho	Cumulative Coho
10-Jul	32	32	0	0	0	0	0	0
11-Jul	107	139	0	0	0	0	0	0
12-Jul	83	222	0	0	0	0	0	0
13-Jul	119	341	0	0	0	0	0	0
14-Jul	519	860	0	0	0	0	0	0
15-Jul	226	1,086	0	0	4	4	0	0
16-Jul	232	1,318	0	0	1	5	0	0
17-Jul	155	1,473	0	0	0	5	0	0
18-Jul	258	1,731	0	0	0	5	0	0
19-Jul	404	2,135	34	34	4	9	0	0
20-Jul	202	2,337	50	84	2	11	0	0
21-Jul	316	2,653	10	94	4	15	0	0
22-Jul	260	2,913	4	98	0	15	0	0
23-Jul	293	3,206	2	100	2	17	0	0
24-Jul	193	3,399	5	105	1	18	0	0
25-Jul	108	3,507	10	115	0	18	0	0
26-Jul	34	3,541	2	117	0	18	0	0
27-Jul	27	3,568	14	131	0	18	0	0
28-Jul	55	3,623	2	133	0	18	0	0
29-Jul	42	3,665	14	147	0	18	0	0
30-Jul	28	3,693	15	162	0	18	0	0
31-Jul	22	3,715	11	173	0	18	0	0
1-Aug	22	3,737	11	184	0	18	0	0
2-Aug	22	3,759	11	195	0	18	0	0
3-Aug	19	3,778	14	209	0	18	0	0
4-Aug	4	3,782	28	237	0	18	0	0
5-Aug	24	3,806	43	280	0	18	0	0
6-Aug	30	3,836	65	345	0	18	0	0
7-Aug	32	3,868	105	450	0	18	0	0
8-Aug	16	3,884	21	471	2	20	0	0
9-Aug	40	3,924	39	510	0	20	0	0
10-Aug	44	3,968	39	549	2	22	0	0
11-Aug	100	4,068	57	606	2	24	0	0
12-Aug	12	4,080	12	618	4	28	0	0
13-Aug	14	4,094	21	639	0	28	0	0
14-Aug	14	4,108	24	663	0	28	0	0
15-Aug	14	4,122	24	687	0	28	0	0
16-Aug	14	4,136	24	711	0	28	0	0
17-Aug	10	4,146	23	734	0	28	0	0
18-Aug	11	4,157	19	753	0	28	2	2
19-Aug	8	4,165	13	766	0	28	26	28
20-Aug	3	4,168	15	781	0	28	38	66
21-Aug	6	4,174	37	818	0	28	55	122
22-Aug	4	4,178	14	832	0	28	26	148
23-Aug	1	4,179	33	865	0	28	44	192
24-Aug	6	4,185	42	907	0	28	46	238
25-Aug	24	4,209	40	947	0	28	30	268
26-Aug	4	4,213	4	951	0	28	30	298
27-Aug	2	4,215	8	959	0	28	25	323
28-Aug	2	4,217	8	967	0	28	25	348
29-Aug	1	4,218	4	971	0	28	18	366
30-Aug	0	4,218	6	977	0	28	14	380
31-Aug	0	4,218	0	977	0	28	76	456
1-Sep	0	4,218	0	977	0	28	54	510

Appendix Table B.6. Expanded daily and cumulative migration of all salmon species past the North River counting tower, Norton Sound, 1999.

After 20 July passage estimates are unreliable because of problems with the weir and flash panel

Date	Daily Chum	Cumulative Chum	Daily Pink	Cumulative Pink	Daily King	Cumulative King	Daily Coho	Cumulative Coho
30-Jun	0	0	0	0	6	6	0	0
1-Jul	2	2	0	0	8	14	0	0
2-Jul	1	3	0	0	3	17	0	0
3-Jul	0	3	0	0	2	19	0	0
4-Jul	0	3	0	0	0	19	0	0
5-Jul	0	3	0	0	0	19	0	0
6-Jul	0	3	166	166	0	19	0	0
7-Jul	14	17	1,006	1,172	2	21	0	0
8-Jul	2	19	718	1,890	6	27	0	0
9-Jul	66	85	1,763	3,653	30	57	0	0
10-Jul	73	158	1,759	5,412	35	92	0	0
11-Jul	85	243	1,299	6,711	52	144	0	0
12-Jul	24	267	600	7,311	48	192	0	0
13-Jul	58	325	2,026	9,337	24	216	0	0
14-Jul	46	371	1,208	10,545	56	272	0	0
15-Jul	136	507	2,150	12,695	36	308	0	0
16-Jul	151	658	2,169	14,864	54	362	0	0
17-Jul	411	1,069	5,947	20,811	123	485	0	0
18-Jul	225	1,294	4,058	24,869	85	570	0	0
19-Jul	138	1,432	2,952	27,821	60	630	0	0
20-Jul	290	1,722	2,418	30,239	424	1,054	1	1
21-Jul ^a	169	1,891	1,615	31,854	221	1,275	2	3
22-Jul ^a	169	2,060	1,615	33,469	221	1,496	2	5
23-Jul ^a	169	2,229	1,615	35,084	221	1,717	2	7
24-Jul ^a	169	2,398	1,615	36,699	221	1,938	2	9
25-Jul ^a	169	2,567	1,615	38,314	221	2,159	2	11
26-Jul	40	2,607	342	38,656	16	2,175	4	15
27-Jul	56	2,663	716	39,372	20	2,195	52	67
28-Jul	76	2,739	780	40,152	20	2,215	30	97
29-Jul	30	2,769	576	40,728	22	2,237	84	181
30-Jul	42	2,811	530	41,258	2	2,239	54	235
31-Jul	45	2,856	836	42,094	5	2,244	88	323
1-Aug	39	2,895	651	42,745	5	2,249	115	438
2-Aug	42	2,937	677	43,422	4	2,253	141	579
3-Aug	49	2,986	767	44,189	3	2,256	169	748
4-Aug	24	3,010	578	44,767	2	2,258	143	891
5-Aug	74	3,084	596	45,363	2	2,260	273	1,164
6-Aug	56	3,140	404	45,767	4	2,264	118	1,282
7-Aug	64	3,204	734	46,501	0	2,264	166	1,470
8-Aug	50	3,254	511	47,012	0	2,264	136	1,606
9-Aug	29	3,283	378	47,390	0	2,264	120	1,728
10-Aug	18	3,301	204	47,594	-2	2,262	126	1,856
11-Aug	47	3,348	229	47,823	-2	2,260	130	1,986
12-Aug	71	3,419	197	48,020	2	2,262	188	2,174
13-Aug	61	3,480	153	48,173	-2	2,260	130	2,304
14-Aug	60	3,540	157	48,330	-1	2,259	129	2,433
15-Aug	59	3,599	161	48,491	0	2,259	128	2,561
16-Aug	201	3,800	109	48,600	-4	2,255	220	2,781
17-Aug	129	3,929	95	48,695	0	2,255	112	2,893
18-Aug	117	4,046	91	48,786	0	2,255	80	2,973
19-Aug	112	4,158	49	48,835	0	2,255	95	3,068
20-Aug	220	4,378	51	48,886	2	2,257	257	3,325
21-Aug	192	4,570	29	48,915	1	2,258	194	3,519
22-Aug	177	4,747	26	48,941	1	2,259	202	3,721
23-Aug	130	4,877	18	48,959	1	2,260	199	3,920
24-Aug	146	5,023	14	48,973	1	2,261	167	4,087
25-Aug	142	5,165	10	48,983	1	2,262	197	4,284
26-Aug	152	5,317	10	48,993	1	2,263	163	4,447
27-Aug	104	5,421	0	48,993	0	2,263	120	4,567
28-Aug	69	5,490	0	48,993	0	2,263	76	4,643
29-Aug	69	5,559	0	48,993	0	2,263	76	4,719
30-Aug	37	5,596	0	48,993	0	2,263	61	4,780
31-Aug	4	5,600	0	48,993	0	2,263	12	4,792

^a Interpolated data due to water conditions

Appendix Table C. 1. Kotzebue District chum salmon commercial catch age composition by fishing period, and season total, 1999.

Brood Year and (Age Group)													
		1996 0.2		1995 0.3		1994 0.4		1993 0.5		1992 0.6		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Period 1													
Sampling Dates: 7/13													
Stratum Dates: 7/13													
Sample Size:	116												
	Male	0	0.0	159	62.9	24	9.5	1	1.7	0	0.0	187	74.1
	Female	0	0.0	54	21.6	11	4.3	0	0.0	0	0.0	65	25.9
	Subtotal	0	0.0	213	84.5	35	13.8	4	1.7	0	0.0	252	100.0
Period 2													
Sampling Dates: 07/15-07/16													
Stratum Dates: 07/15-07/16													
Sample Size:	265												
	Male	8	0.8	539	53.6	137	13.6	0	0.0	0	0.0	683	67.9
	Female	0	0.0	228	22.6	91	9.0	4	0.4	0	0.0	323	32.1
	Subtotal	8	0.8	767	76.2	228	22.6	4	0.4	0	0.0	1,006	100.0
Period 3													
Sampling Dates: 7/19													
Stratum Dates: 7/19													
Sample Size:	223												
	Male	5	0.9	300	52.5	64	11.2	3	0.4	3	0.4	374	65.5
	Female	0	0.0	175	30.5	23	4.0	0	0.0	0	0.0	198	34.5
	Subtotal	5	0.9	475	83.0	87	15.2	3	0.4	3	0.4	572	100.0
Period 4													
Sampling Dates: 7/22-7/23													
Stratum Dates: 7/22-7/23													
Sample Size:	249												
	Male	2	0.4	271	52.6	27	5.2	4	0.8	0	0.0	304	59.0
	Female	0	0.0	186	36.2	16	3.2	8	1.6	0	0.0	211	41.0
	Subtotal	2	0.4	457	88.8	43	8.4	12	2.4	0	0.0	515	100.0
Period 5													
Sampling Dates: 07/26-07/28													
Stratum Dates: 07/26-07/28													
Sample Size:	253												
	Male	0	0.0	6,572	49.1	917	6.9	153	1.2	51	0.4	7,692	57.4
	Female	0	0.0	4,839	36.1	862	4.9	153	1.1	51	0.4	5,706	42.6
	Subtotal	0	0.0	11,411	85.2	1,579	11.8	306	2.3	102	0.8	13,398	100.0
Period 6													
Sampling Dates: 07/28-07/30													
Stratum Dates: 07/28-07/30													
Sample Size:	253												
	Male	0	0.0	5,098	43.7	709	6.1	0	0.0	0	0.0	5,807	49.8
	Female	0	0.0	5,363	46.0	399	3.4	89	0.8	0	0.0	5,851	50.2
	Subtotal	0	0.0	10,461	89.7	1,108	9.5	89	0.8	0	0.0	11,658	100.0
Period 7													
Sampling Dates: 8/02-8/04													
Stratum Dates: 8/02-8/04													
Sample Size:	253												
	Male	97	0.4	10,086	39.6	1,552	6.1	97	0.4	0	0.0	11,831	46.4
	Female	97	0.4	11,637	45.6	1,939	7.6	0	0.0	0	0.0	13,674	53.6
	Subtotal	194	0.8	21,723	85.2	3,491	13.7	97	0.4	0	0.0	25,505	100.0
Period 8													
Sampling Dates: 8/6													
Stratum Dates: 8/6													
Sample Size:	254												
	Male	0	0.0	7,926	54.3	689	4.7	172	1.2	57	0.4	8,845	60.6
	Female	0	0.0	5,055	34.7	632	4.4	58	0.4	0	0.0	5,744	39.4
	Subtotal	0	0.0	12,981	89.0	1,321	9.1	230	1.6	57	0.4	14,589	100.0

(Continued)

Appendix Table C.1. (page 2 of 2)

Brood Year and Age Group													
		1996 0.2		1995 0.3		1994 0.4		1993 0.5		1992 0.6		Total	
		N	%	N	%	N	%	N	%	N	%	N	%
Period 9													
Sampling Dates: 5/9													
Stratum Dates: 5/9													
Sample Size:	252												
	Male	220	0.8	15,055	54.4	669	2.4	0	0.0	0.0	0.0	15,934.0	57.5
	Female	0	0.0	10,660	36.5	989	3.6	0	0.0	0.0	0.0	11,759.0	42.5
	Subtotal	220	0.8	25,715	92.9	1,648	6.0	0	0.0	0.0	0.0	27,693.0	100.0
Period 10													
Sampling Dates: 5/12													
Stratum Dates: 5/12													
Sample Size:	254												
	Male	62	0.4	6,333	40.5	1,168	7.5	0	0.0	0.0	0.0	7,563.0	48.4
	Female	61	0.4	6,886	44.1	1,045	6.7	61	0.4	0.0	0.0	8,054.0	51.6
	Subtotal	123	0.8	13,219	84.6	2,213	14.2	61	0.4	0.0	0.0	15,617.0	100.0
Period 11													
Sampling Dates: 08/16-08/18													
Stratum Dates: 08/16-08/18													
Sample Size:	261												
	Male	73	0.4	7,142	34.9	1,312	6.4	218	1.1	0.0	0.0	8,745	42.7
	Female	291	1.4	10,276	50.2	1,020	5.0	146	0.7	0.0	0.0	11,734	57.3
	Subtotal	364	1.8	17,418	85.1	2,332	11.4	364	1.8	0.0	0.0	20,479	100.0
Period 12													
Sampling Dates: 08/19-08/20													
Stratum Dates: 08/19-08/20													
Sample Size:	171												
	Male	33	1.7	601	32.1	55	2.9	0	0.0	0.0	0.0	688	36.6
	Female	44	2.3	1,693	90.6	131	7.0	0	0.0	0.0	0.0	1,180	63.2
	Subtotal	77	4.0	2,294	122.7	186	9.9	0	0.0	0.0	0.0	1,868	100.0
Period 13													
Sampling Dates: 08/23-08/24													
Stratum Dates: 08/23-08/24													
Sample Size:	241												
	Male	157	3.7	1,888	40.2	105	2.5	0	0.0	0.0	0.0	1,950	46.5
	Female	17	0.4	2,054	49.0	174	4.1	0	0.0	0.0	0.0	2,245	53.5
	Subtotal	174	4.1	3,942	89.2	279	6.6	0	0.0	0.0	0.0	4,195	100.0
Period 14													
Sampling Dates: 8/27													
Stratum Dates: 8/27													
Sample Size:	325												
	Male	31	1.8	670	37.8	79	4.4	8	0.4	0.0	0.0	788	44.4
	Female	24	1.3	804	45.3	134	7.6	16	0.9	6.0	0.4	985	55.6
	Subtotal	55	3.1	1,474	83.1	213	12.0	24	1.3	6.0	0.4	1,773	100.0
Season Total													
Sampling Dates: 07/13-08/27													
Stratum Dates: 07/13-08/27													
Sample Size:	3,320												
	Male	687	0.5	62,439	44.9	7,496	5.4	860	0.5	111	0.1	71,393	51.3
	Females	502	0.4	59,310	42.6	7,213	5.2	534	0.4	169	0.1	67,727	48.7
	Total	1,189	0.9	121,749	87.5	14,709	10.6	1,194	0.9	280	0.2	139,120	100.0

Appendix Table C.2. Kobuk River drift gillnet test fishing chum salmon catch age and sex composition by time period, and season total, 1999

		Brood Year and (Age Group)					Total
		1996 (0.2)	1995 (0.3)	1994 (0.4)	1993 (0.5)	1992 (0.6)	
Sampling Dates:	7/17-7/24						
Sample Size:	88						
Male	Percent	0.0	51.1	1.1	2.3	0.0	54.5
	Number	0	45	1	2	0	48
Female	Percent	0.0	42.1	2.3	0.0	1.1	45.5
	Number	0	37	2	0	1	40
Total	Percent	0.0	93.2	3.4	2.3	1.1	100.0
	Number in Catch	0	82	3	2	1	88
Sampling Dates:	7/25-7/31						
Sample Size:	253						
Male	Percent	0.4	59.3	5.5	2.0	0.4	67.6
	Number	1	150	14	5	1	171
Female	Percent	0.0	29.0	2.8	0.4	0.0	32.4
	Number	0	74	7	1	0	82
Total	Percent of Catch	0.4	88.5	8.3	2.4	0.4	100.0
	Number in Catch	1	224	21	6	1	253
Sampling Dates:	8/2-8/15						
Sample Size:	356						
Male	Percent	0.0	52.8	3.1	0.3	0.0	56.2
	Number	0	188	11	1	0	200
Female	Percent	0.0	41.0	2.8	0.0	0.0	43.8
	Number	0	146	10	0	0	156
Total	Percent	0.0	93.8	5.9	0.3	0.0	100.0
	Number	0	334	21	1	0	356
Sampling Dates:	8/9-8/13						
Sample Size:	216						
Male	Percent	1.4	53.2	2.3	1.4	0.0	58.3
	Number	3	115	5	3	0	126
Female	Percent	0.0	39.4	1.9	0.5	0.0	41.7
	Number	0	85	4	1	0	90
Total	Percent	3.0	92.6	4.2	1.9	0.0	100.0
	Number	3	200	9	4	0	216
Sampling Dates:	7/17-8/13	Season Total					
Sample Size:	913						
Male	Percent	0.4	54.5	3.4	1.2	0.1	59.7
	Number	4	498	31	11	1	545
Female	Percent	0.0	37.5	2.5	0.2	0.1	40.3
	Number	0	342	23	2	1	368
Total	Percent	0.4	92.0	5.9	1.4	0.2	100.0
	Number	4	840	54	13	2	913